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**More than 80%
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The Computer Display Review is the acknowledged source of information in the field of display technology. Now, in its sixth year, it answers questions and solves problems about every aspect of information technology.

The Computer Display Review is never out-of-date, never obsolete; making it an excellent investment. It is updated three times a year with supplements.

The Computer Display Review comes in four volumes and includes more than 2000 looseleaf pages of text, tables, photos, line drawings and charts. Each page is 8½" x 11" and printed in large, legible type. All information is categorized into four convenient sections:

1. A history of information displays and a description of current and potential applications of display devices.
2. Computer display fundamentals with detailed tutorials on state-of-the-art hardware, engineering concepts and software techniques.
3. A listing of the important hardware and software characteristics of available alphanumeric and line-drawing display terminals, as well as of related display devices.
4. A comparative analysis of the features and price/performance effectiveness of alphanumeric displays and line-drawing displays.

The Computer Display Review is published by the Computer Publications Division of Keydata Corporation, a pioneer in the field of on-line, time-shared computer services. Its two technical publications — The Computer Display Review and The Computer Characteristics Review — are regarded as the most comprehensive and up-to-date authorities in their fields.

Keydata's outstanding reputation comes from major accomplishments in a number of areas including:

1. Computer graphic display and man-machine interactive systems



2. On-line control systems
3. Simulation
4. Data management and information retrieval
5. Business information systems

This brochure contains a complete table of contents, sample pages and a partial list of subscribers. After reading it you will have a good understanding of why we feel The Computer Display Review should be your top display consultant.

To order "your consultant," use the reply card in the back cover. If you would like more information, please write to me personally.

John F. Martell
Editor-in-chief

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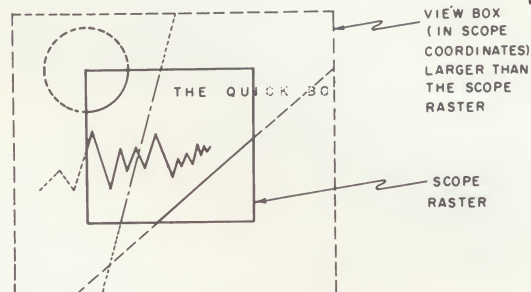
The following sample pages have been reproduced to illustrate the logical organization and convenience of The Computer Display Review. Notes are used extensively and each device reviewed is also analyzed comparatively with other equipment of the same classification. In addition, the most current available pricing information is provided in detail.

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View Box Clipping

The view box, when scaled to scope coordinates, usually represents an area not larger than the scope raster. Some hardware devices have automatic scissoring, in which the view box and the display vectors describing the entities enclosed in it can, as illustrated below, be larger than the scope raster, and the hardware will clip the display vectors to the raster size. For some applications, particularly where hardware clipping is unavailable, software clipping must be employed. Hardware clipping requires less CPU time but more display processor time in an attempt to display a larger amount of data, a portion of which is outside the screen. Software clipping, on the other hand, requires more CPU time and less display processor time.



Sample Alphanumeric Display

Sample Alphanumeric Display

THE COMPUTER DISPLAY REVIEW

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ATC 2000 SERIES DATA DISPLAY TERMINAL

Controller Interfaces

Parallel rate: 125,000 cps Serial rate: 125,000 cps
Computers: IBM System/360
Data lines: Bell 202D and 201B or equivalents

Edit Features

Overlay: no Split screen: yes⁵
Edit levels: 1 or 2 (optional)⁶ Cursor type: nondestructive
Insert: yes Delete: yes
Tabulation: variable length⁷ Blink: optional

Other Features

Auto Tab Erase - Upon successful completion of read cycle (data transmitted to CPU) all variable fields are erased as an indication to the operator that the operation is complete.

Character Generation and Display

Character definition: digital stroke Display method: cursive stroke
Draw time: 8 usec Stroke count: 15
Character code: ASCII/IBM Number of fonts: 1
Text modes: 1 Vertical text: none
Standard size: .15 x .20 max Sizes: 1
Characters per line: 80, 64, or 40 Lines per display: 48, 30, or 24
Characters per flicker-free frame: 1,920

Alphanumeric Text Test Display

Percent displayable: 64% Number of words: 2,050

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ATC 2000 SERIES DATA DISPLAY TERMINAL

Item	Purchase	Lease
<u>Remote Stand Alone Terminals</u>		
ATC 2845/2265 (960 char capacity)	\$ 8,250	\$ 260
ATC 2846/2266 (1,920 char capacity)	\$ 10,000	\$ 300

Local or Remote Multi-Station Systems

<u>240 Characters per Station</u>		
ATC 4821 (controller)	\$ 8,500	\$ 220
ATC 4824 (expansion unit-drives 8 display stations)	\$ 4,500	\$ 120
ATC 2263 (display station w/keyboard)	\$ 3,250	\$ 90

<u>480 Characters per Station</u>		
ATC 4822 (controller)	\$ 8,500	\$ 220
ATC 4848 (expansion unit-drives 4 display stations)	\$ 4,000	\$ 110
ATC 2264 (display station w/keyboard)	\$ 3,500	\$ 95

<u>960 Characters per Station</u>		
ATC 4823 (controller)	\$ 8,500	\$ 220
ATC 4896 (expansion unit-drives 2 display stations)	\$ 3,750	\$ 105
ATC 2265 (display station w/keyboard)	\$ 3,750	\$ 100

<u>1,920 Characters per Station</u>		
ATC 4824 (controller)	\$ 8,500	\$ 220
ATC 4819 (expansion unit-drives 1 display station)	\$ 3,500	\$ 100
ATC 2266 (display station)	\$ 4,000	\$ 105

Options include expanded character set, printer adaptor and limited graphics. Contact manufacturer for prices of options and quantity discount prices.

Sample Alphanumeric Display Analysis

Sample Line-Drawing Display

THE COMPUTER DISPLAY REVIEW

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Controller	Maximum Displays for Basic Controller	Expands in Maximum Display Units		Maximum Total Characters
		from	to	
Raytheon 400	10 (1,040)	53	64	66,560
Control Data 210	12 (1,000)	11	63	63,000
ATC 2000 Series	32 (1,920)	1	32	61,440
SINTRA 4000	1 (2,048)	1	18	36,864
SINTRA TE 500	1 (520)	1	64	33,280
Elliott Series 20	8 (4,096)	1	8	32,768
Datagraphix 1110	1 (1,079)	1	24	25,896
Univac 300	16 (512)	1	48	24,576
LFE SM-2A	10 (800)	N/A	N/A	8,000
Burroughs B9351	4 (251)	8	16	4,032
Ferranti 50	4 (832)	N/A	N/A	3,328
Computek Series 100	3 (1,095)	1	3	3,285
Sanders 701	4 (256)	4	12	3,072
Raytheon 500	1 (2,720)	N/A	N/A	2,720
Ferranti 60	16 (150)	N/A	N/A	2,400
Hendrix Series 5100	1 (2,400)	N/A	N/A	2,400
Ferranti TDM 2000	1 (2,048)	N/A	N/A	2,048
Omera/Segid 500	8 (256)	1	8	2,048
XDS 7550	1 (2,048)	N/A	N/A	2,048
Sanders 920-102	1 (1,944)	N/A	N/A	1,944
Computer Terminal	1 (1,800)	N/A	N/A	1,800
Omera/Segid 800	1 (1,024)	N/A	N/A	1,024
TEC Data Screen	1 (1,024)	N/A	N/A	1,024
Univac 100	1 (1,024)	N/A	N/A	1,024
Wyle Model 600	1 (1,024)	N/A	N/A	1,024
Ferranti TDM 1000	1 (1,000)	N/A	N/A	1,000
Spiras Systems IRASCOPE	1 (1,000)	N/A	N/A	1,000
Burroughs B9352	1 (960)	N/A	N/A	960
CONRAC 201	1 (960)	N/A	N/A	960
IBM 2265	1 (960)	N/A	N/A	960
Sanders 620	1 (768)	N/A	N/A	768
Lear Siegler 810	1 (640)	N/A	N/A	640

Figure IV.5

EXPANSION OF ALPHANUMERIC SYSTEMS

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GRAPHIC DISPLAYS ETOM 2000

Physical Characteristics

Console size and weight: 66" wide, 51" high, 26" deep, 400 lbs
Controller size and weight: integral¹
Power input: 230 VAC, 50 Hz; 115 VAC, 60 Hz
Environment: office environment

Cathode Ray Tube Design

Tube size: 17" O.D.	Tube shape: rectangular
Phosphor type: unknown	Colors: blue, orange
Display size: 12" x 12"	Display area: 144 sq. in.
Raster count: 512 x 512	Raster interval: .023" x .023"
Deflection method: EM	Deflection type: random scan
Focus method: EM	Spot diameter: unknown
Stability: $\pm 3\%$	Repeatability: unknown
Brightness: unknown	Contrast: unknown

Console Input Devices

Keyboard: no	Function switches: by software
Pointer: light pen	Other: X,Y digitizer

Auxiliary Equipment

Teletypewriter, incremental plotter, paper tape equipment

Controller Design³

Processors: single	Word length: 16 bits
Memory type: core	Memory size: 512 or 1,024 words
Memory cycle time: unknown	Refresher rate: 25 fps
Line generator: yes	Character generator: optional
Subroutining: no	Scissoring: no
Keyboard interpret: no	Function switch interpret: no
Pointer tracking: no	Item identification: no

Sample Line-Drawing Display

Sample Line-Drawing Display Analysis

GRAPHIC DISPLAYS ETOM 2000

Notes

1. The main control electronics of the ETOM are housed in a desk having ample space for the addition of extra modules (character generator, circle generator). The digitizer, if fitted, is contained in a drawer which is extended when in use. The display screen and function keyboard are in a single housing which rests on top of the desk.
2. Commands can be input to the computer by means of 22 function keys housed in the display console. Each key will generate a five-bit pattern, the significance of which is predetermined by the computer program running at the time.
3. The controller supplied is not capable of subroutining, scissoring, keyboard interpret, function switch interpret, pointer tracking, or item identification. However, any of these functions are possible by the interfacing computer.
4. The standard vector generator is able to deflect the CRT beam in any direction up to 63 raster units from its current position to produce vectors up to 1.5 inches in length. Pictures are composed of a sequence of such vectors, and individual lines can be made to flash to highlight parts of the display. An optional beam position module allows the rapid positioning of the beam from any point on the screen to any other point within the 512 x 512 matrix when not drawing a line. This is achieved by using one memory word for position X and one word for position Y.

System	Minimum	Maximum	Mean
Vector General	11,592	12,696	12,144
Control Data Grid	9,523	12,121	10,822
Sanders ADDS/900	9,243	11,192	10,717
Control Data 250	8,080	9,520	8,800
SAP 300	5,128	11,111	8,119
SEL 816A	6,349	9,523	7,493
Adage GT/50	7,073	7,913	7,493
III 1060	5,328	8,888	7,108
Univac 1557/1558	6,488	7,619	7,053
ITT OPSC	3,703	9,999	6,847
Tasker 9200	5,925	7,619	6,772
Digigraphics	4,848	8,669	6,758
DEC Graphic 15	5,128	8,000	6,564
IDI CM 10000	4,938	7,843	6,390
Evans & Sutherland Model 1	5,673	6,837	6,255
Ferranti 30/40	2,545	9,542	6,043
IDIHOM	4,581	6,888	5,734
XDS 7580	4,760	6,504	5,632
BR-90	3,555	7,111	5,333
IDI Model E1	4,761	5,333	5,047
Monitor 8100	4,102	5,925	5,014
SIG 100	3,333	6,666	4,999
SINTRA VU 2000	4,301	5,128	4,714
SAP 200	3,555	5,333	4,444
Tasker 9100	2,614	4,938	3,776
ITT MACC	2,515	2,806	2,660
IBM 2250/III	1,375	3,933	2,654
IBM 2250/IV	1,516	3,663	2,589
IBM 2250/I	1,230	3,933	2,581
Toshiba DDS 300	1,776	2,200	1,988
RCA 6320	1,481	2,222	1,851
DIDS-1500	1,233	1,480	1,356
Philco READ	1,206	1,282	1,244
ICL 4280	1,037	1,288	1,162
ICL 1830	511	1,010	760
Imiac PDS-1	724	781	752
SD 1090	391	410	400
DEC 338/339	230	241	236
Control Data dd16C	216	216	216
DEC 340	190	195	193

Figure V.7

LINE DRAWING DISPLAYS
INCHES OF LONG LINES PER FLICKER-FREE FRAME

Editorial Staff

John F. Martell

Former National Secretary and New England Chapter Chairman of the Society for Information Display

1967—Present

As Editor-in-Chief of The Computer Display Review and General Manager of the Publication Division of Keydata Corporation.

Directs special studies concerning display technology, applications and market analysis.

Engages in projects involving graphic man-machine communication techniques.

1964-1967

As Chief of Display Techniques Group, Decision Sciences Laboratory, Electronic Systems Division, L.G. Hanscom Field.

Conceived and conducted major programs of research, design engineering and system analysis in data presentation.

Guided analysts and psychologists engaged in research and systems design.

Consulted on all matters related to state-of-the-art and system utilization of displays.

Advised and consulted on display for the U.S. Mutual Weapons Development Program with the DRME of France and the Ministry of Defense of West Germany.

1960-1964

As Deputy Director of the Directorate of Displays, Electronic Systems Division, AFSC (formerly CCDD)

Ensured that the state-of-the-art in display technology was compatible with existing and future Air Force requirements.

Acted as advisor to Working Group VI, Vision and Displays of the National Academy of Sciences.

Consulted, analyzed and developed operational requirements and performance specifications for display systems for the Deputy for Systems Management.

1954-1960

As Project Engineer, Lincoln Project Office, AFCRL (formerly the Air Force Cambridge Research Center)

Primarily engaged in the implementation of the SAGE system and developed advanced display concepts.

1954

Was graduated from Tufts University, BSEE

George M. Luhowy

Member of the Society for Information Display.

Member of Special Interest Groups of ACM

1966-Present

As Technical Editor of The Computer Display Review, Editor of The Computer Characteristics Review and Manager of the Publication Division of Keydata Corporation.

Consults for manufacturers and users of displays and related equipment.

Recently completed an International Interactive Graphics Market Analysis resulting in a definition of the size and application spectrum of such devices, and projections on their future use.

Participated in a study on the feasibility of using large screen and interactive graphic display devices to monitor and control traffic flow for a U.S. Government Agency.

Developed on-line real-time commercial applications and constructs large-scale logic tables for file manipulation.

While on assignment at Raytheon's Missile Systems Division, wrote the compiler and part of a simulator used in a large machine-aided system to simulate logic circuitry and generate output tapes for an automatic wiring machine.

1963-1966

Programmer Analyst, Honeywell

Developed projects in the field of design automation on the H-800.

1963

Was graduated from Fairleigh Dickenson University, BSEE

Daniel J. Sliski, Jr.

Member of the Society for Information Display

1968-Present

As Associate Editor of The Computer Display Review and The Computer Characteristics Review.

Investigates new, advanced technologies applicable to computer display. Collects, verifies and analyzes all technical data for publication.

Served as senior member of a team responsible for an international co-sponsored study entitled, Interactive Graphics Technology and Market Analysis.

Served as a member of a team responsible for designing and implementing a time-shared interactive graphics software package for a major U.S. Computer and display manufacturer.

While on assignment to a major oil company organized a data base for an interactive graphic oil movement control system.

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